NAVSEA
NAVAL SEA SYSTEMS COMMAND

Human Systems Integration Directorate

Transforming the Sailor

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NAVSEA 03

SEA 03 Functional Responsibilities

- **Sea Warrior Alignment**
  - CFFC, OPNAV (N7, N00T, N12), CNP (PERS 4), NETC, NPDC, HPC, Learning Centers, Virtual SYSCOM
- **HSI Technical Authority/Program Certification**
  - Policy, Standards, Best Business Practices
  - HSI Plans, Human Performance Metrics, Skill Objects
- **HSI Requirements**
  - CONOPS, ICD, CDD, CPD
- **HSI Technology Investment, Assessment, Transition**
  - Human Performance implications
  - Sea Trial, SURFTEC

CNO 2004 Guidance: Embed Human Performance Model into every Navy Acquisition and R&D Program

SEA WARRIOR

Sailor Performance and Professional De

Mission Planning System

Human Systems Integration

Career Management System

5 Vector Model

Optimal Sailor Performance

SEA WARRIOR …Sailor performance delivering SEA POWER 21

Human Performance is…

A critical determiner of mission success for complex, technology-driven, optimally-manned ships and systems of the 21st century, derived from a comprehensive top-down functional analysis of warfighting requirements

Hardware ⟷ **People** ⟷ **Software**

FORCEnet

Total System Performance

Measurable And Certifiable

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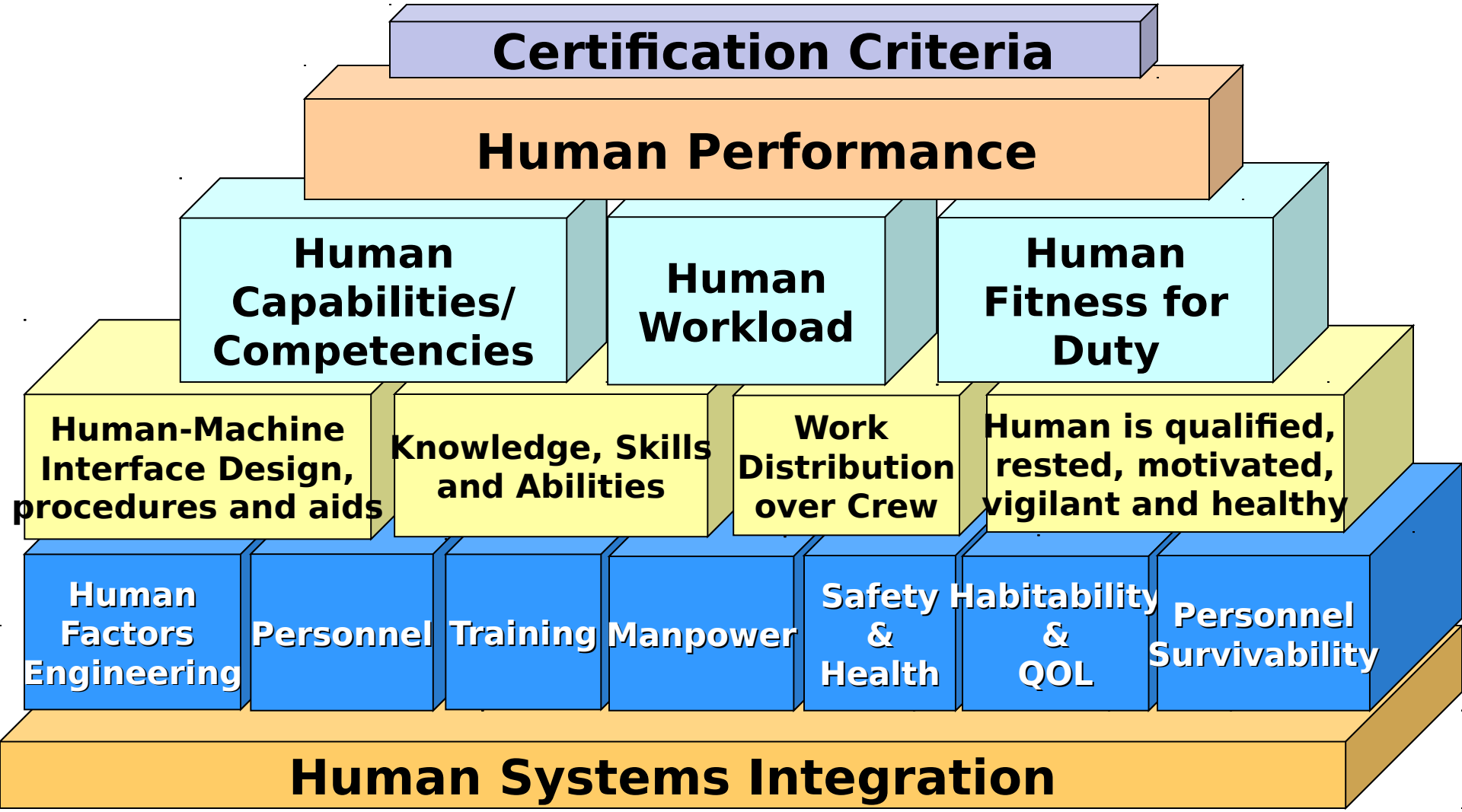
Building Blocks of Human Performance



Engineering Human Performance

Compatible Business Rules & Common Standards

HSI in Acquisition

SYSCOMS
HPC
OP N12

TDFA Functions
Tasks
Skills
Skill Objects

Blended Solution

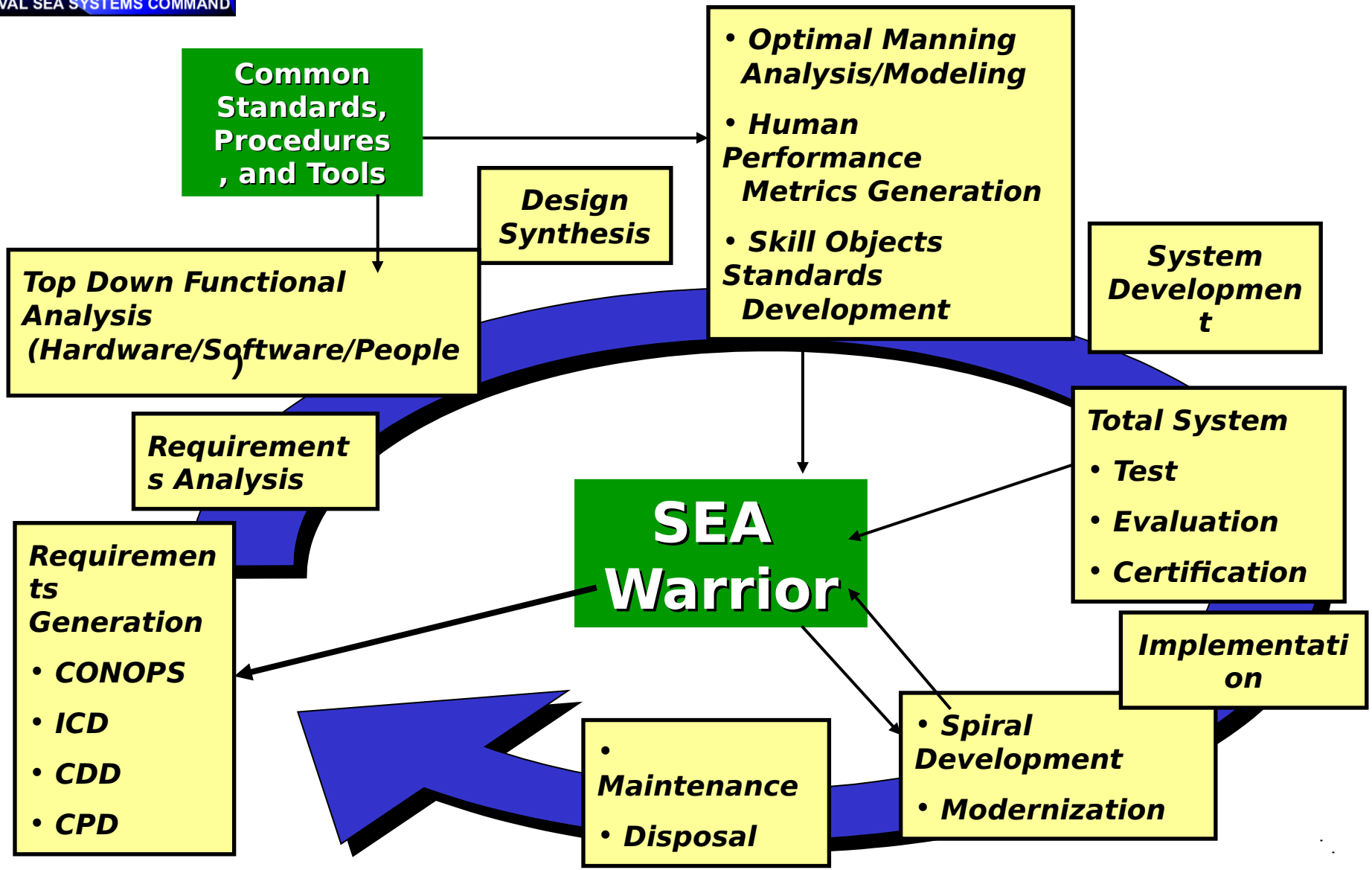
Human Performance Metrics
Tailored Training Solutions

Revolution in Training

NETC/NPDC

Skills Based Performance and Training

Total Systems Engineering



Human Systems Integration Focus

Human Performance Metrics

Human Performance	Total Ship Design	Subsystem Design	Modernization
• Time to Respond/Complete Task	X	X	X
• Accuracy/Reliability	X	X	X
• Availability	X	X	X
• Workload – Cognitive and Physical	X	X	X
• Situational Awareness	X	X	X
Fitness for Duty			
• # of hours continuously on watch / duty	X	X	X
Personnel and Training			
• # of billets that require special skills	X	X	X
• Time & cost to train to specified proficiency		X	X
Manpower			
• # of work hours = X billets	X	X	X
System Design			
• Human engineering design compliance	X	X	X

Program Performance Metrics

		Total Ship Design	Subsystem Design	Modern-ization
Program Management	HSIP	X	X	X
	Integration with Systems Engineering	X	X	X
Funding	FYDP	X	X	X
Human Factors Engineering	ASTM F1166, MIL-STD 1472F	X	X	X
	Task Analysis, Human Performance	X	X	X
	Top-Down Requirements Analysis (TDRA)	X	X	X
Manpower	TDRA/Workload Analysis	X	X	X
Personnel	KSAs, Occupational Specialties	X	X	X
Training	KSAs, Workload and Task Analyses	X	X	X
	TRPPM/NTSP	X	X	X
Survivability	Anti-Fratricide	X	X	X
	Egress	X		X
ESOH	PESHE, Hazard Analysis	X	X	X
Habitability	OPNAVINST 9640.1A	X	X	X

SEA 03 Accomplishments

Technical Authority/Certification

- Conducted HSI Technical Feasibility Assessments on DD(X) and LCS
- Certified DD(X) HSI to proceed to CDR
- Developed SHIPMAIN/C5I HSI certification criteria
- Defined HSI Technical Authority Pyramid and Pro s
- Drafted HSI in Acquisition and Modernization Instruction (NAVSEAINST 3900.8A)
  - Common Program/Human Performance Metrics
- Conducted 20 HSI Program Reviews including DD(X), LCS, CG Modernization, and CVN 21
- Conducted 100 reviews as voting member of WSESRB

SEA 03 Accomplishments

Alignment

- **Established HSI in Acquisition as a Sea Warrior Component**
  - **Introduced program management discipline in TF Warrior**
  - **Developed Business Rules for ILE**
  - **Filled 5 of 5 technical positions in Navy Learning Centers**
  - **Established LCS/Sea Warrior Working Group**
    - **LCS and Science of Learning to be briefed 8 July**
- **Approved Virtual SYSCOM HSI MOA - - - Chartered HSI Working Group**
  - **Developing Common Presentation Layer standard for LCS mission packages**
  - **Supporting CFFC Task Force SIM**
- **Defined Warfighter-Systems Performance Assessment Capability objectives**
- **Established process with CFFC and HPC to provide technical solutions for Fleet identified HP issues**
  - **Ineffective Damage Control Communications systems**
  - **Manpower intensive Main Space Fire Fighting procedures**
  - **Ineffective biological agent detection**

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LCS HSI

HSI Technical Feasibility Assessment

- Reconcile Flight 0 manpower requirements with 75 bunk constraint
- Bound shore infrastructure impact
- Determine TSTA/skills-based training requirements
- Conduct ‘ship motion influence on human performance’ testing

HSI Way Ahead

- Flight One Top Down Functional Analysis
- Sea Warrior integration
- Common Presentation Layer for Mission Packages

DD (X) HSI

HSI Technical Feasibility Assessment

- **Integrate HSI Risk and Mitigation Plan into Systems Engineering**
- **Complete Top Down Functional Analysis**
- **Determine TSTA/Skills Based Training**
- **Determine Shore Infrastructure impact**

Sailor System Specification

- **Elevates HSI to the Total System level**
- **Institutes HSI Certification at each milestone**
- **Examples:**
  - **HP criteria traceable to system design**
  - **Common display formats**
  - **Proactive rather than reactive Usability Testing**

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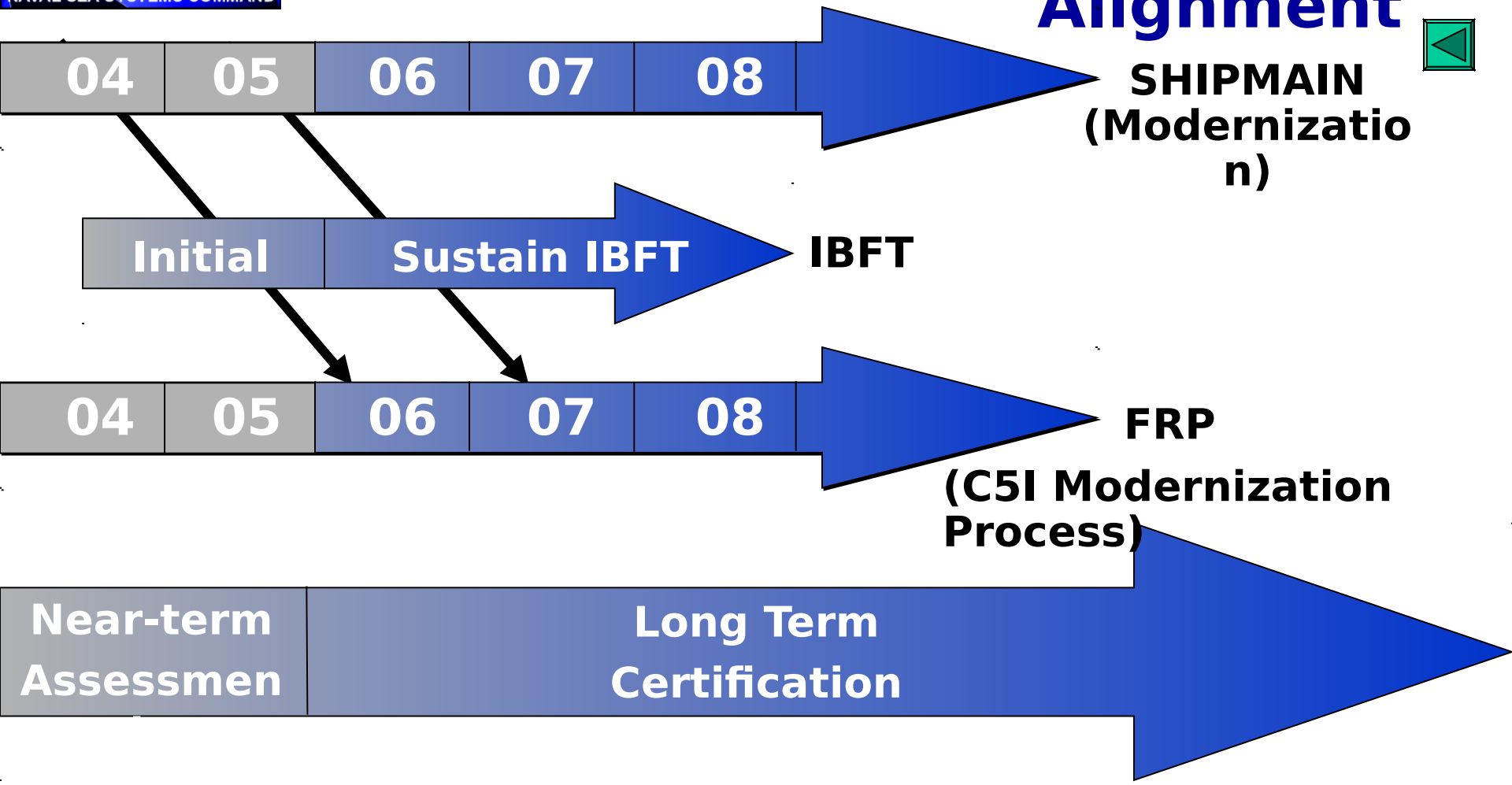
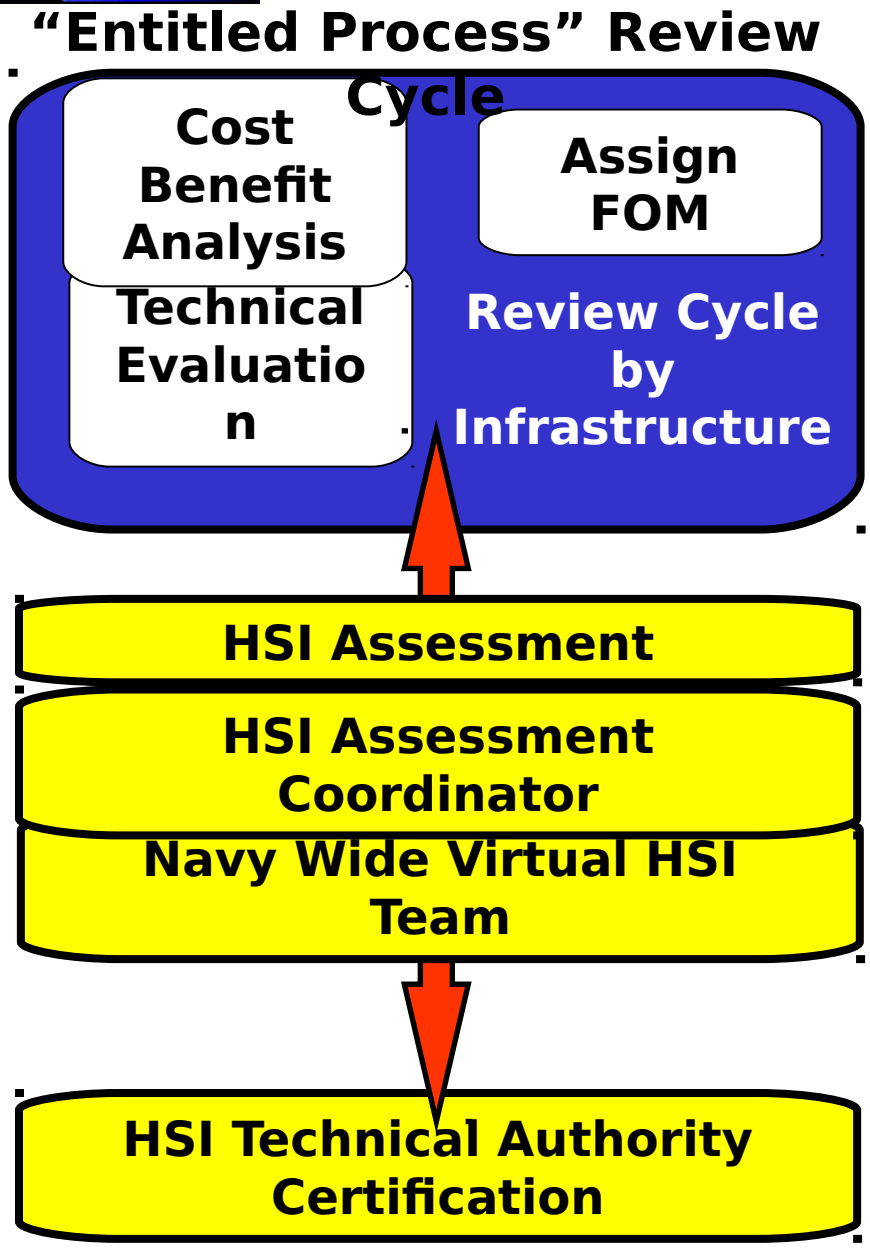
HSI Certification Authority Alignment



CFFC Msg 032037Z May 04 C5IMP Policy: "SEA 03 Develop Joint SYSCOM HSI Certification Standards and Policy"

SHIPMAIN HSI Evaluation



HSI v-Team:

- **ASSESS** Modification Proposal for impact on Sailor Skills, Workload, and Performance
- **ASSESS** Modification System Performance SPEC for integration of Hardware, Software, and People

HSI Technical Authority:

- **CERTIFY** Modification System Detail SPEC to ensure System Optimized for Sailor Performance

Results:

- Common Assessment and Certification Process for New Acquisitions and Modernization
- Focus on FRP
- Define Sailor Performance
- Skill Based Tailored Training

Warfighter-Systems Performance Assessment Capability Integration Lab (Initial Facilities)

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- DEP/JDEP
- Integrated Command Environment
- Human Performance Laboratory
- Warfare System Presentation Facility – NUWC (COOPEX)
- Joint Unmanned Systems Common Control (JUSC2)

SPAWAR

- Composeable FORCEnet

NAVAIR

- Crew Station Tech Lab
- Environmental Physiology and Human Performance Lab
- Human Systems Electro-optics Lab

CAPABILITIES

- Fleet – Port Hueneme
- Data Collection and Analysis - Corona
- Off-Board Unmanned Underwater Systems Experimentation - NUWC

SEA 03 HSI Way Ahead

1. Exercise HSI Technical Authority
2. Optimize new construction manning and human performance
   - LCS
   - DD(X)
   - CVN 21
   - LHA (R)
3. Lead Virtual SYSCOM HSI effort
   - Common Presentation Layer
   - Best Practices
   - Task Force SIM Alignment
4. Integrate SEA WARRIOR principles into all Navy Acquisition activities
5. Implement Optimal Manning Experiment/Sea Swap Lessons Learned
6. Exercise SHIPMAIN/C5I certification
7. Establish ROI Metrics
8. Coordinate HSI S&T Investment Strategy with

HSI in Acquisition Principles

- **Sailors are the most valuable shipboard system**
  - Design ships and systems accordingly
  - Provide Optimal Manning and Tailored Training Solutions
- **Total System Performance is the focus**
  - Hardware, Software and **SAILORS**
  - Function/Task Based Requirements Analysis
  - Human Performance Metrics/Skill Sets
- **Current, accurate and relevant technical training and integrated training architectures are essential**
  - Learning Center/Fleet Training Activity technical support
  - Total Ship Training Architecture
    - Compatible/interoperable with existing and future systems